

United States Department of Agriculture
Agricultural Research Administration
Bureau of Entomology and Plant Quarantine

A DEVICE FOR SPRAYING BEAN SEED
IN THE ROW WHILE PLANTING

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In connection with investigations on the control of the seed-corn maggot (*Hylemya cilicrura* Rond.) in southern California, an attachment to a bean planter has been developed for spraying lima bean seed and the adjacent soil with an insecticide as a part of the seed-planting operation. With this attachment the spray is applied directly behind the boot of the planter while it is in motion. The spray covers the seed immediately after it falls, before it is covered with soil. The attachment was first tried with a hand planter during the summer of 1948 and with a commercial planter in 1949. This paper describes the construction and operation of the attachment.

Construction

The planter attachment (fig. 1) is constructed so that it slides over the heel of the boot of a lima bean planter (A). A commercial nozzle (B) is screwed onto a 3-inch section of 1/4-inch iron pipe that has been bent. This pipe is welded to a 3-inch section of 1 1/2-inch iron pipe split lengthwise. A metal flange, 2 by 3 inches, is welded to each side of the split section of pipe. This section of pipe (C) holds the nozzle rigid, and the adjustable clamp (C) holds the attachment in place and allows it to be raised or lowered as desired. The flange's act as baffles and prevent the soil from falling back into place until after the nozzle has passed (D). A rubber hose (C) leads away from the planter attachment to the sprayer.

Figure 1, D, shows the attachment in place and ready for use. The nozzle shown delivers 0.3 gallon of spray per minute at a 65-degree angle in a flat pattern, at a pressure of 40 pounds per square inch. It is provided with interchangeable filters of 50- or 100-mesh screen,

^{1/} This work was done at Alhambra, Calif., under the direction of Roy E. Campbell and with the assistance of bean farmers in Los Angeles and Orange Counties.

and a series of tips with orifices that deliver from 0.1 to 0.8 gallon per minute at 40 pounds' pressure and at spray angles ranging from 15 to 80 degrees. Of the several nozzle tips that have been tested, the one delivering 0.3 gallon per minute is the most satisfactory.

Operation

For experimental use four of the planter boots of an eight-row lima bean planter were fitted with these attachments. Each nozzle was adjusted so that the tip was about 2 1/2 inches higher than the tip of the boot point and the spray struck about 1 inch to the rear of where the seed fell. With four nozzles, two delivering 0.15 and two delivering 0.3 gallon per minute, 8 and 16 gallons per acre were applied in 30-inch rows by properly adjusting the planter speed and spray pressure.

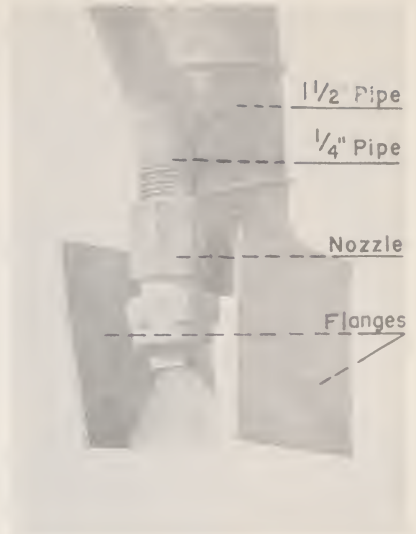
Insecticides in the form of wettable powders were used, at concentrations of 1 to 6 pounds of the powder per 100 gallons of water. At these concentrations it was possible to apply comparatively small quantities of insecticides ranging from a fraction of 1 ounce up to 7 1/2 ounces per acre in 30-inch rows. Of the many insecticides tested chlordane and aldrin were the most promising against the seed-corn maggot.

With this method of spraying lima bean seed at the time it is planted, the concentration of insecticide in contact with the seed is much lower and subject to more accurate control than with methods of coating the seed before planting. Furthermore, smaller quantities of insecticide than are required for broadcast soil treatment are applied to a narrow strip of soil.

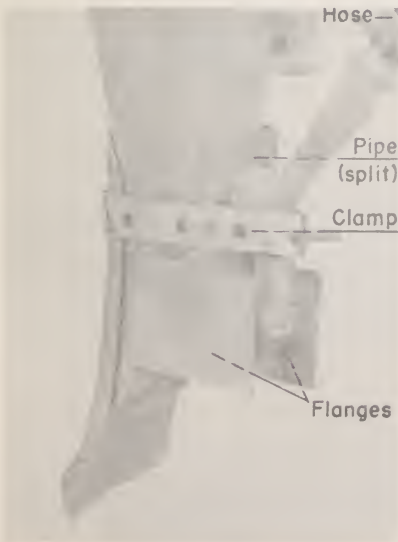
Any type of spray pump that will operate at low pressure and capacity is suitable for this type of application. The writer used a small rotary pump equipped with an easily adjustable pressure-relief valve and a 10-gallon can containing the material to be tested.



A (x 7/16)



B (x 5/6)



C (x 7/16)



D (x 5/9)

Figure 1.--Different views of bean-planter boot attachment for applying liquid insecticides.

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